

REMARKS

Claims 1-47 are pending. By this Amendment, claims 23-29 and 42 are cancelled and claims 30, 43 and 44 are amended. Following entry of this Amendment, forty (40) claims will be pending (claims 1-22, 30-41 and 43-47) of which six (6) are independent (claims 1, 21, 30, 44, 46 and 47). No new matter will be incorporated into the present application by entry of this Amendment. If the Office determines that any additional fees are deemed to be necessary with the filing of this Amendment, then the Office is authorized and requested to charge such fees to Deposit Account No. 061910.

Applicant's representatives would like to thank Examiner Blackwell-Rudasill for extending them the courtesy of a personal interview on May 18, 2004 to discuss this case. This Amendment is being filed together with a recordation of the substance of the interview in accordance with MPEP 713.04.

In the Office Action mailed December 17, 2003, the Examiner rejected claims 1-4, 7-12 and 16-22 under 35 U.S.C. 102(b) as being anticipated by Glaser et al. (U.S. Patent 5,837,361); rejected claim 44 under 35 U.S.C. 102(b) as being anticipated by Macquart et al. (U.S. Patent 5,935,702); rejected claims 1-4, 7-10, 21 and 23-28 under 35 U.S.C. 103(a) as being unpatentable over EP '330 (European Patent Application Publication 0747330) in view of Macquart et al.; rejected claims 1-29, 44-45 and 47 under 35 U.S.C. 103(a) as being unpatentable over WO '649 (International Patent Application Publication 97/48649) in view of Macquart et al., further in view of Applicant's admission; rejected claims 30-45 under 35 U.S.C. 103(a) as being unpatentable over WO '131 (International Patent Application Publication 01/44131) in view of Macquart et al.; and rejected claim 46 under 35 U.S.C. 103(a) as being unpatentable over

Buhay et al. (United States Patent Application Publication 2003/0180547). Applicant respectfully traverses, and requests reconsideration of, each of these rejections.

The present Amendment is being filed with a view toward obtaining the allowance of claims at the earliest possible date. Applicant maintains that the original claims are patentably distinct over the cited art. The ensuing discussion, for example, highlights features that appear in the original claims and are considered to be patentably distinct from the cited art. Therefore, Applicant expressly reserves the right to pursue the original claims in further prosecution.

The Examiner rejected claims 1-4, 7-12 and 16-22 under 35 U.S.C. 102(b) as being anticipated by Glaser et al. Applicant respectfully disagrees with the rejection of these claims and the characterization of the Glaser reference. The rejection cites language in Glaser referring to a lower coating with a first layer comprising silicon or a metal and nitrogen or oxygen. The silicon-containing material to which Glaser refers, however, is silicon nitride, not silicon dioxide. This is evident from the disclosure of Glaser, including the discussion at column 3, lines 43-46, where Glaser teaches *a layer based on a metal oxide, of the bismuth oxide or tin oxide type, or based on silicon nitride*. The skilled reader of this reference would not consider it obvious to replace the silicon nitride taught by Glaser with silicon dioxide. Silicon nitride has a much higher refractive index than silicon dioxide. In particular, the index of silicon nitride is about 2.0, while that of silicon dioxide is only about 1.4-1.5. Glaser repeatedly lauds the benefits of using high refractive index material for the lower coating. For example, Glaser makes the following statement at column 5, lines 36-41: "...it is possible to provide, by using a lower coating which combines a bismuth oxide layer having a high refractive index with a layer having a low refractive index formed from zinc oxide, that a stack that gives the overall substrate a very neutral color in transmission and a very neutral color in reflection.". While this statement speaks

in the context of Glaser's main embodiment (where bismuth oxide is used as the first layer of the lower coating), it emphasizes the importance of using high index film in the lower coating. This statement also shows that both of the layers in Glaser's lower coating are designed to have a substantial impact on the optics (e.g., antireflection and color) of the coating. Skilled artisans would not expect silicon dioxide, which has a refractive index substantially matching that of glass, to serve this function when positioned directly on the substrate. Further, Glaser expressly indicates that the refractive index of the described layers should not be substantially modified. Glaser states, at column 5, lines 4-10, that the described layers need not consist entirely of the described materials, but rather can contain small quantities of other materials "on the condition, preferably that the optical properties, in particular the refractive index, of these layers are not substantially modified. The same applies to all the other layers of the coatings of dielectric material...". Thus, Glaser teaches against any modification that would involve a substantial change in the refractive index of the described films. This would, of course, include the two layers of Glaser's lower coating, which are detailed as being formed of materials having a refractive index of at least about 2.0 (and preferably about 2.35). Since replacing silicon nitride (or bismuth oxide or tin oxide) with silicon dioxide would result in a very substantial decrease in refractive index, Applicant submits that this modification would be far from obvious. Therefore, Applicant requests reconsideration.

The Examiner rejected claim 44 under 35 U.S.C. 102(b) as being anticipated by Macquart et al. Applicant respectfully disagrees with the rejection of this claim and the characterization of the Macquart reference. Claim 44 is being amended, however, to pursue the allowance of claims at the earliest possible date, by requiring the first film layer comprising silicon dioxide to have a

thickness of less than 100 angstroms. Applicant reserves the right to pursue the original claim in continuing prosecution.

With respect to amended claim 44, Macquart teaches a silicon oxide base layer that serves as a *diffusion barrier*, e.g., as a barrier to the diffusion of alkaline and oxygen. Silicon dioxide has been used in certain types of coatings to serve as a sodium ion diffusion barrier, which prevents sodium ions from migrating out of a glass substrate and into overlying film. When silicon dioxide is used for this purpose, however, it is generally thought to be necessary to provide the silicon dioxide at a much greater thickness than is presently claimed. Even the Macquart reference teaches that such silicon dioxide should have a thickness of 100 angstroms or more to be effective as a barrier layer. In particular, Macquart states “It can then be given only a sufficient thickness of 10 nanometers or more to ensure its effectiveness as a barrier layer and then overlaid with layers of dielectric material based on conventional metal oxides and or known thicknesses which fulfill the desired optical role...” (Macquart, column 5, lines 16-21). Given these teachings, and in view of the conventional wisdom in the art that silicon dioxide should be relatively thick to be effective as a barrier layer, skilled artisans would not expect a silicon dioxide layer having a thickness of less than 100 angstroms to serve effectively as a barrier layer.

Applicant provides its silicon dioxide base layer for purposes other than those taught in the art. For example, rather than providing silicon dioxide to serve as a diffusion barrier, Applicant has designed its silicon dioxide base layer to offset substrate defects and control the haze that can occur when the coated glass is tempered or otherwise heat treated. To achieve this purpose, Applicant provides its silicon dioxide base layer at an incredibly small thickness, which is designed to be just thick enough to smooth out the surface of the substrate, which may be corroded or otherwise rough before it is coated, without being so thick as to unacceptably

increase the overall roughness of the coating, as could actually exacerbate the very haze and roughness problems the base layer is designed to solve. Thus, the purposes for which Applicant's silicon dioxide base layer is designed calls for an exceptionally small film thickness, whereas silicon dioxide diffusion barrier layers call for great thicknesses. Accordingly, skilled readers of the Macquart reference would not consider it obvious to modify the teachings of this reference in any way that would result in a low-emissivity coating having a silicon dioxide base layer with a thickness of less than 100 angstroms.

The Examiner rejected claims 1-4, 7-10, 21 and 23-28 under 35 U.S.C. 103(a) as being unpatentable over EP '330 in view of Macquart et al. Applicant respectfully disagrees with the rejection of these claims and the characterization of these references.

Claims 23-28 have been cancelled, thereby rendering this rejection of these claims moot. Applicant is canceling these claims with the goal of obtaining allowance, at the earliest possible date, of claims drawn to embodiments involving a silicon dioxide base layer having a thickness of less than 100 angstroms. Applicant maintains, however, that the cancelled claims are patentably distinct from the cited art, and expressly reserves the right to pursue such claims in continuing prosecution.

With respect to claims 1-4, 7-10 and 21, the rejection states that it would have been obvious to modify the structure of EP '330 with the silicon oxide coating of Macquart to create a low emissivity film structure that provides barrier protection to the layers overlying the substrate by preventing the diffusion of oxygen and alkaline in addition to preventing the modification of the optical and thermal properties when the substrate is submitted to thermal treatment. To establish obviousness, the cited references when combined must teach or suggest all of the claimed limitations. Neither EP '330 nor the Macquart reference teaches a silicon dioxide base

layer with a thickness of less than 100 angstroms. Therefore, any combination of these references would fail to achieve a low-emissivity coating having a silicon dioxide base layer with a thickness of less than 100 angstroms. Further, Applicant considers that any modification following a combination of these two references would fail to achieve a silicon dioxide base layer with a thickness of less than 100 angstroms for the reasons discussed above with respect to claims 1-4, 7-12, 16-22 and 44.

The Examiner rejected claims 1-29, 44-45 and 47 under 35 U.S.C. 103(a) as being unpatentable over WO '649 in view of Macquart et al., further in view of Applicant's admission. Applicant respectfully disagrees with the rejection of these claims and the characterizations here.

Claims 23-29 have been cancelled, thereby rendering this rejection of these claims moot. Applicant is canceling these claims with a view toward obtaining allowance, at the earliest possible date, of claims drawn to embodiments involving a silicon dioxide base layer having a thickness of less than 100 angstroms. Applicant maintains, however, that the cancelled claims are patentably distinct from the cited art, and expressly reserves the right to pursue such claims in continuing prosecution.

With respect to claims 1-22, 44-45 and 47, each of these claims involves a silicon dioxide base layer having a thickness of less than 100 angstroms. In view of the remarks above, Applicant considers that these claims are non-obvious. Further, Applicant considers that WO '649 fails to provide any additional teaching or suggestion that would lead a person of skill in the art to provide a silicon dioxide base layer at a thickness of less than 100 angstroms.

The Examiner rejected claims 30-45 under 35 U.S.C. 103(a) as being unpatentable over International Patent Application Publication No. 01/44131 (hereinafter WO '131) in view of Macquart. Applicant respectfully disagrees with the rejection of these claims and the

characterization of these references. Independent claims 30 and 44, however, are being amended to recite a silicon dioxide layer having a thickness of less than 100 angstroms. These claims are being amended to pursue the allowance of claims at the earliest possible date. Applicant reserves the right to pursue the original claims in continuing prosecution.

With respect to claims 30-45, each of these claims now involves a silicon dioxide base layer having a thickness of less than 100 angstroms. In view of the remarks above, Applicant considers that these claims are non-obvious. Further, Applicant considers that WO '131 fails to provide any additional teaching or suggestion that would lead a person of skill in the art to provide a silicon dioxide base layer at a thickness of less than 100 angstroms.

The Examiner rejected claim 46 under 35 U.S.C. 103(a) as being unpatentable over Buhay et al. Applicant respectfully disagrees with this rejection and the characterization of the Buhay reference. As claim 46 involves a silicon dioxide base layer having a thickness of less than 100 angstroms, Applicant believes this claim is non-obvious over the cited art for the reasons discussed above. Further, Applicant considers that Buhay does not provide any additional teaching or suggestion that would lead a person of skill in the art to provide a silicon dioxide base layer at a thickness of less than 100 angstroms.

In view of the foregoing, it is submitted that claims of application are in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully

requested. The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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